NAVAIR
Process Resource Team

**Broadening the Ability to Train and Launch
Effective Engineering and Service Teams**

May 2011

		Form Approved OMB No. 0704-0188

Report Documentation Page

1. REPORT DATE **MAY 2011**	2. REPORT TYPE	3. DATES COVERED **00-00-2011 to 00-00-2011**
4. TITLE AND SUBTITLE **Broadening the Ability to Train and Launch Effective Engineering and Service Teams**		5a. CONTRACT NUMBER
		5b. GRANT NUMBER
		5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)		5d. PROJECT NUMBER
		5e. TASK NUMBER
		5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Naval Air Systems Command,Process Resource Team,47123 Buse Road, Building 2272 Suite 540,Patuxent River,MD,20670**		8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES
Presented at the 23rd Systems and Software Technology Conference (SSTC), 16-19 May 2011, Salt Lake City, UT

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**29**	

Agenda

- NAVAIR

- TPI Implementation

- Process Modeling

- Bringing TPI Together

- NAVAIR Team Performance

- Things to Remember

NAVAIR

What is NAVAIR?

- NAVAIR is the **Naval Air Systems Command**

- Develop, acquire, and support the **aircraft** and related **weapons** systems used by **U.S. Navy and Marine Corps**

- Our **goal is to provide the fleet with quality products** that are both **affordable** and **available** when most **needed**

- Our support extends across the **entire life span** of a product, including all **upgrades and modifications** to that product

NAV AIR

Where is NAVAIR?

Lakehurst
ALRE - SUPPORT EQ
AIRCRAFT DIVISION

China Lake
WEAPONS
DIVISION

Patuxent River
NAVAIRHQ, PEOs
AIRCRAFT DIVISION

Pt Mugu
WEAPONS
DIVISION

Cherry Point
NADEP DEPOT

NADEP DEPOT
North Island
NATEC DEPOT

Jacksonville
NADEP DEPOT

Orlando
TRAINING
SYSTEMS
DIVISION

★ **NAVAIR Headquarters**

● **Acquisition/Test/Development Centers**

▲ **Naval Aviation Depots**

NAVAIR
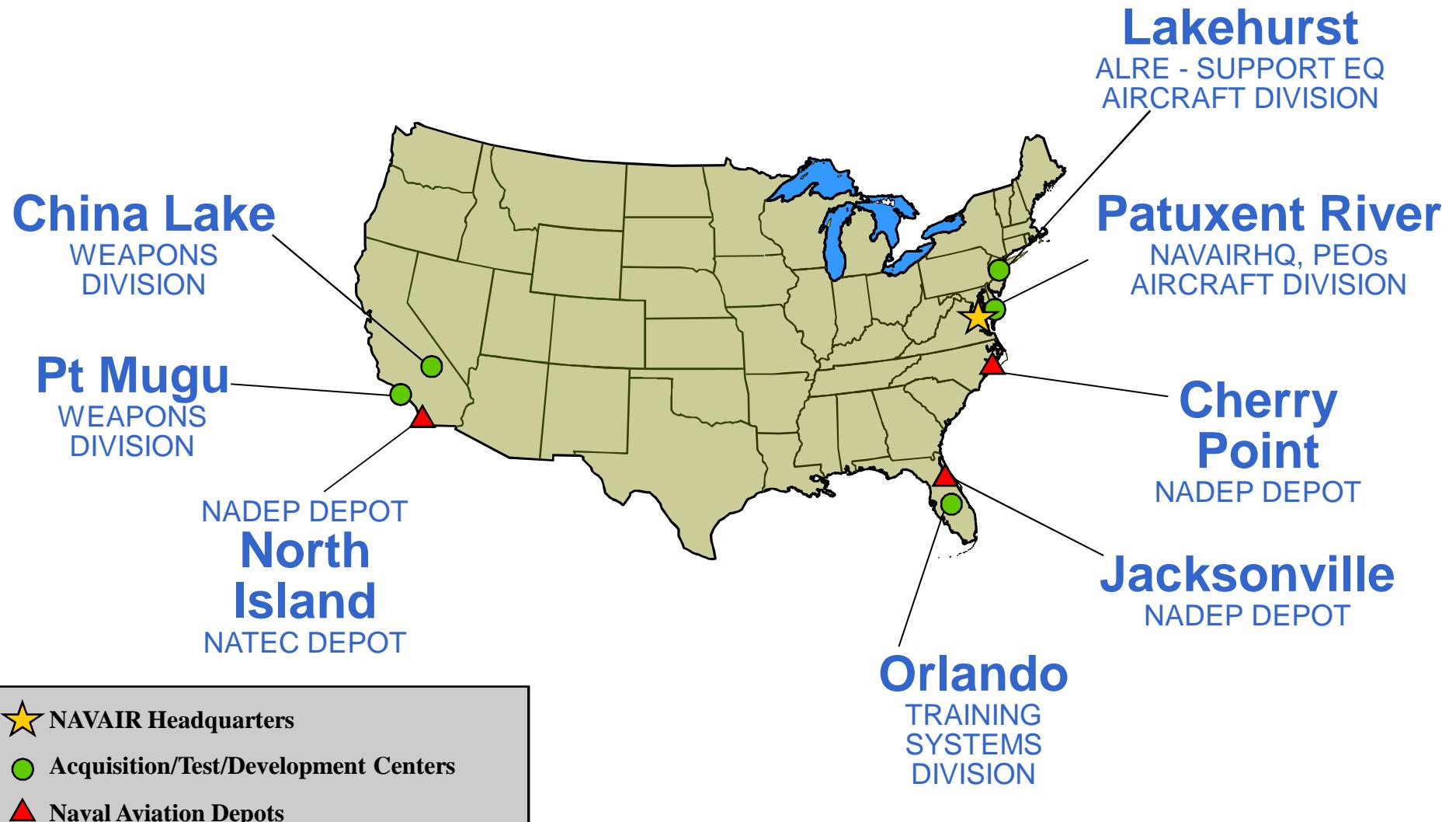
TPI Implementation

# Models and Processes

Capability Maturity Models:
*Reference for organizations
building process capability*
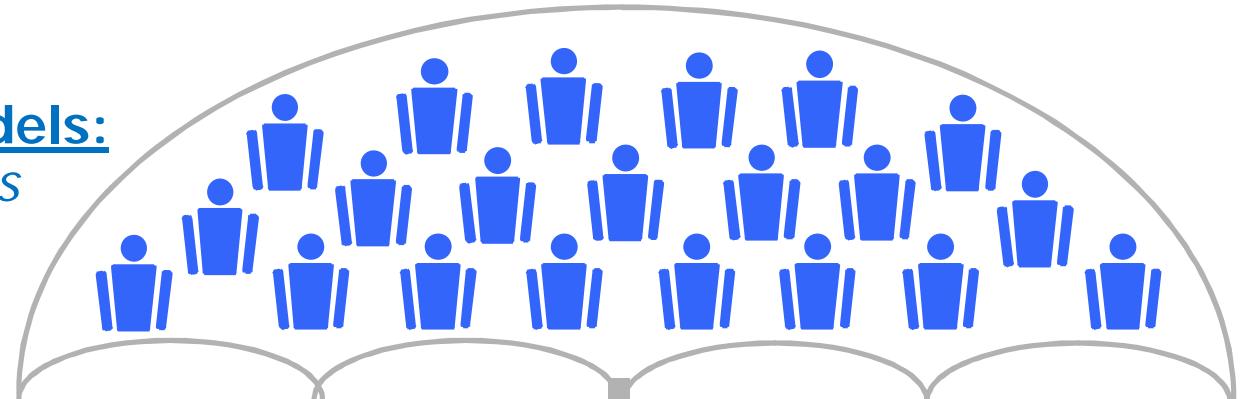
Team Processes:
Processes for teams
*building quality products
on cost and schedule*
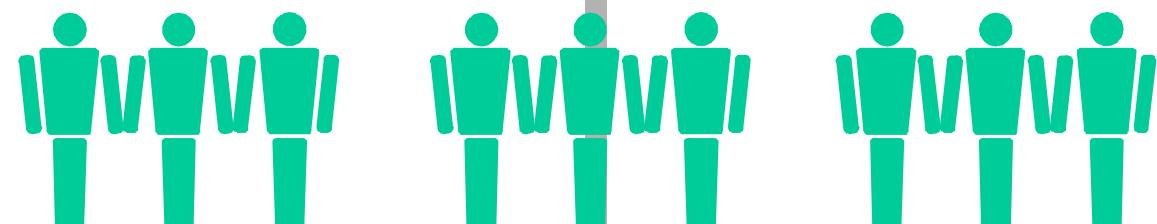
Personal Processes:
*Processes used to train
individual skill and
discipline*

NAV AIR

NAVAIR PI History

Process Improvement Phase

Year

Year		
2011	Change Management	**Team Process Based Systems+**
2010	Process Modeling	
2009		
2008		
2007	TPI Launches	**Team Process Based Systems**
2006		
2005	TPI Research	
2004		
2003	CMMI	**Model Based Systems**
2002		
2001	TSP Launches	**Team Process Based Software**
2000		
1999		
1998		**Personal Process Based Software**
1997	PSP classes	
1996		
1995		
1994		**Model Based Software**
1993	CMM	

NAVAIR

Key Project Management Framework

Process Elements & TPI

Scripts

Document the process entry criteria, phases/steps, and exit criteria. The purpose is to **guide** you as you use the process.

Measures

Measure the process and the product. They provide insight into how the process is working and the **status** of the work.

Forms, Logs, Charts
(paperless)

Provide a **convenient and consistent framework** for gathering, retaining, viewing **data**

Standards

Provide consistent **definitions** that guide the **work** and gathering of **data**.

NAVAIR TPI

- Success of TSP projects led their organizations to ask for same project performance on other teams
  - Worked with the SEI to develop approach
  - Based on same TSP fundamental principles

- NAVAIR approach has become TPI for all teams
  - Teams plan all work from first launch forward
  - Work is based on all products and services defined in process modeling
  - PSP for Engineers training planned as part of project if appropriate

NAV AIR

Evolution of the TPI Approach

- Training has become just-in-time
- Explicit process modeling techniques added prior to launch
  - Better supports team's unique measurement framework
  - Enables team ability to establish firm foothold on planning and tracking
- Teams immediately begin to define quality for themselves
  - Log mistakes during first cycle
  - First post mortem analysis of mistakes leads to identification of rework types
  - Second launch will begin the application of mistake types

NAV AIR

Team **Measures** and **Metrics**

- **Each team member gathers four basic measures**
  - **Time**
  - **Size**
  - **Mistakes**
  - **Task completions**

Charts and tables of project metrics are available (updated in real time)
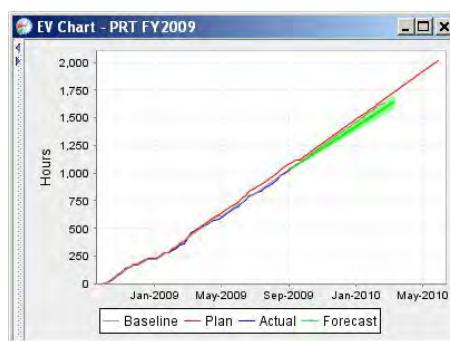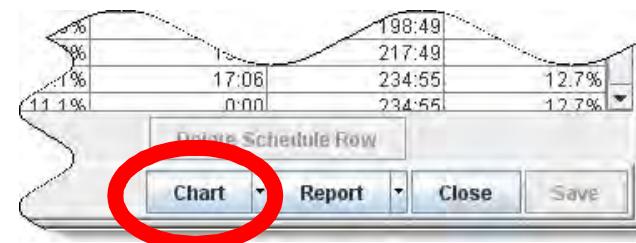
Direct Hours
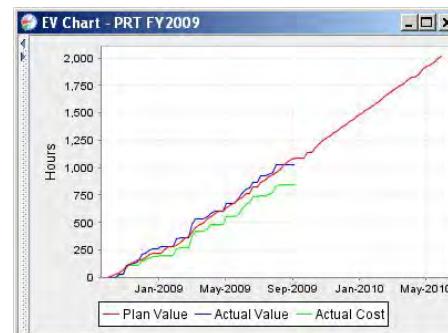
Earned Value
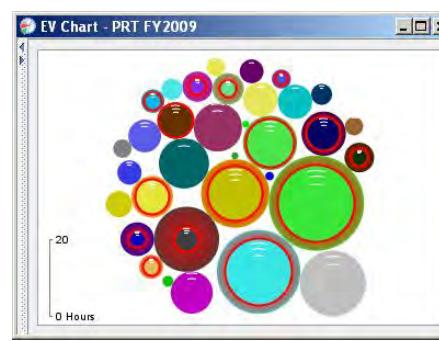
Tasks in Progress

many more...

NAV AIR
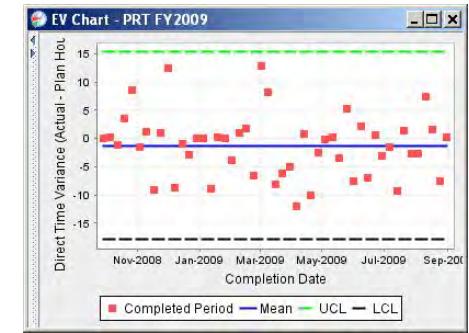
Process Modeling

Process Modeling

- Method for describing processes
  - Existing "as is" processes
  - Desired "to be" processes

BEFORE

AFTER
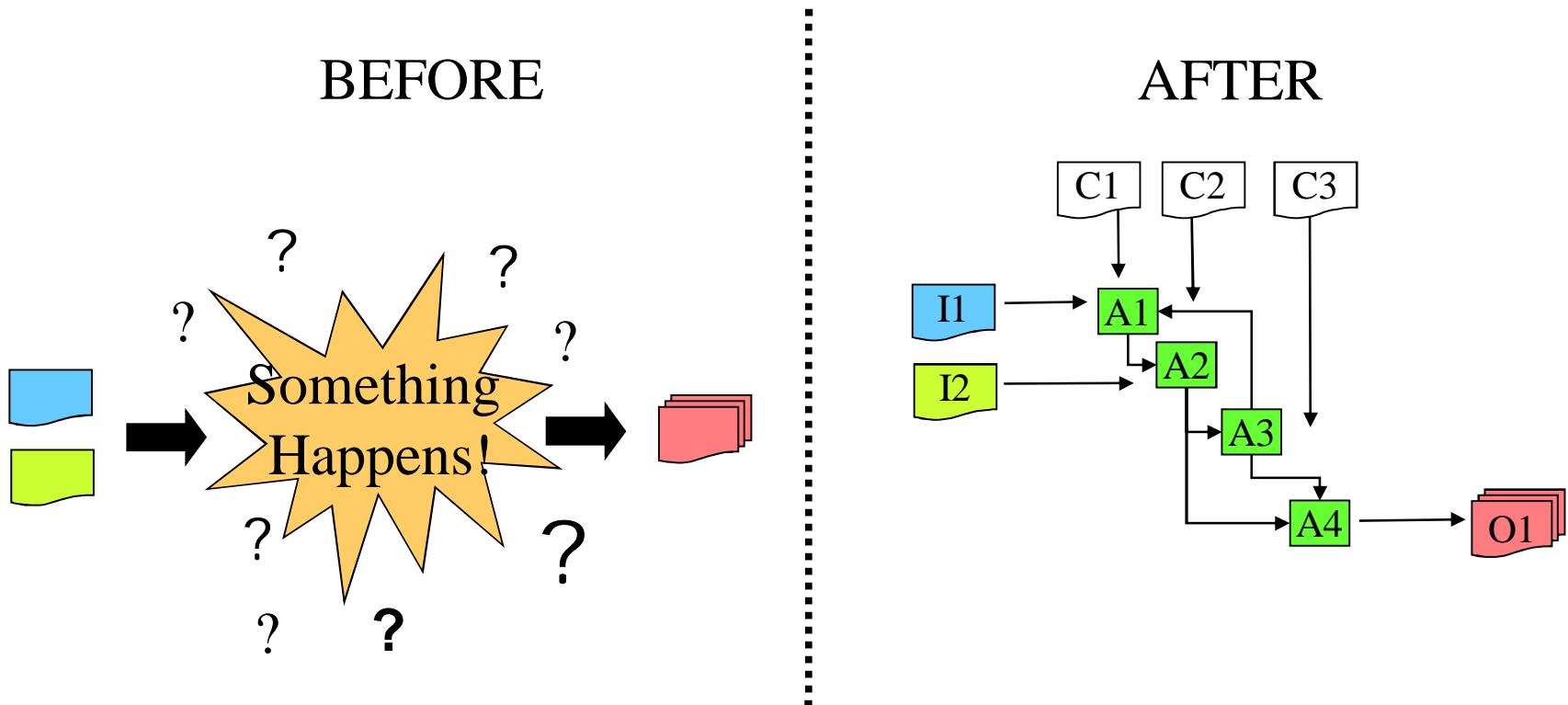
Process Modeling

Each field captures certain aspects of the process activity

The nouns and verbs identified here become key in the definition of the life cycle models unique to each team
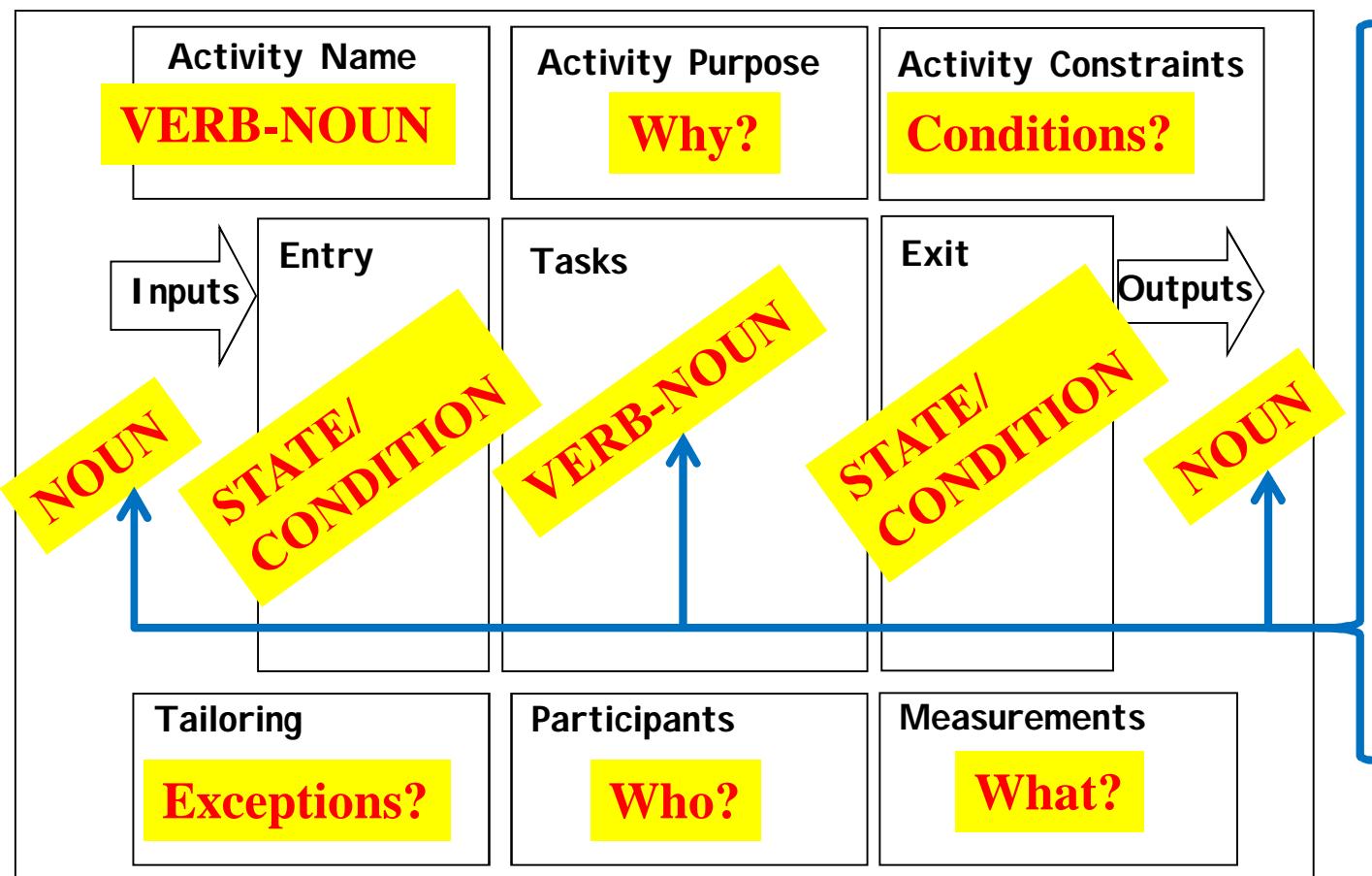
Scripted Process Results

- Given to team for peer review prior to launch

- Reviewed by team in launch for quality removal potential

- Maintainable process artifacts post launch

Process Name: Perform Ground Testing

|	
Purpose	- Verify performance of system under test in aircraft in safe ground environment
Controls	- Constraint aircraft available - Test plan - 3960 - TECT
Tailoring	- Xpdr testing
Participants	- Test Engineers - MX support - Aircrew - Contractors (Bell, NG) - PMA
Measurements	- Test coordinator spreadsheets - CM data base metrics
Inputs	- Test procedures (from CM) - Aircraft mod package - Aircraft configuration - GSE Licenses and Certs - Fly Me - Weekly aircraft schedule
Entry Criteria	- Ensure required hardware is installed - Ensure test equipment available - Ensure aircraft is available - Coordinate ground turn if required - Coordinate capture carry article if required - Coordinate with test coordinator
General	- N/A

Step	Activities	Description (details)
1	Check in with QA maintenance	- TBD
2	Perform aircraft setup ground test procedures	- TBD
3	Run procedures	- TBD
4	Redline procedures	- Verify repeatable conditions - Check out QA and maintenance - Create TAR

Exit Criteria	- Results exist for each test point - TAR created - MAF signed
Outputs	- Performed Test - TAR# - Redlined procedures - Notes and data for SARs - Test event data

Bringing TPI Together

Just in Time TPI

Learning

Personal Process
(half-day)

Personal Planning
Personal Quality
Plan Overview
(half-day)

Operational Overview
TPI Tool Overview
(half-day)

PSP Fundamentals
(one week)

Doing

Process Modeling
(one to four half-day sessions)

Plan the work
(four days)

Work the plan
(cycle 1)
(three to nine months)
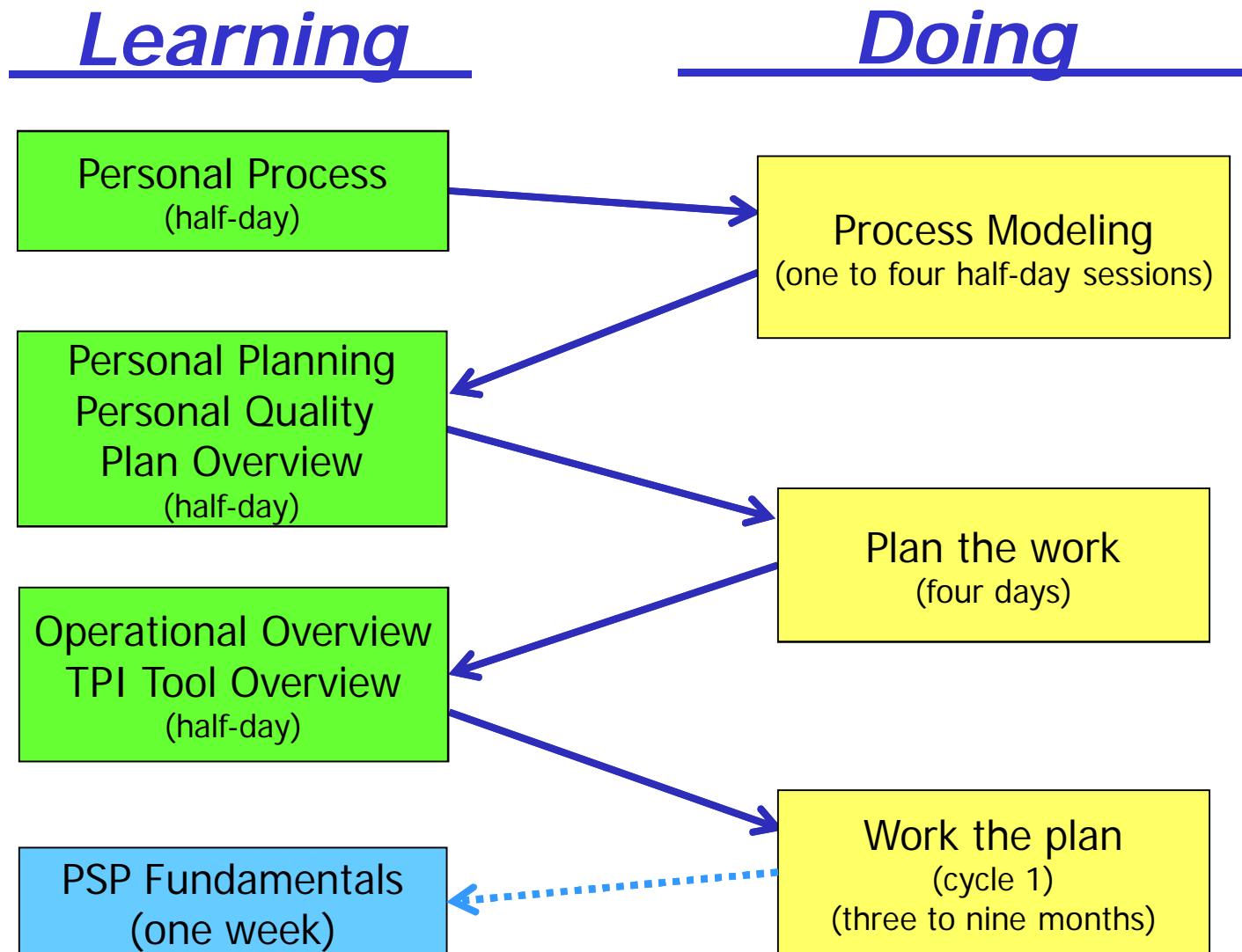
NAV AIR

What's next for TPI

- Definition of CBA (cost benefit analysis)
  - Use team data to show performance metrics
- Defined tiers of TPI
  - Associated ROI so that we can answer the question from the customer

    "…so what am I getting for my investment…"

NAV AIR

NAVAIR Team Performance

NAVAIR Team Data Profiles FY10-FY11

Num of Teams   19

Num of Teams (by type of work performed)

    Tactical/Embedded Software Dev   12

    Desktop Software Dev   6

    Systems Integration   1

	Min	Avg	Max
Num of Team Members	2	6	12
Performance Period (months)	4	9	18

NAV AIR

NAVAIR Teams
Schedule

Schedule Deviation Comparison
NAVAIR Teams versus Industry Standards
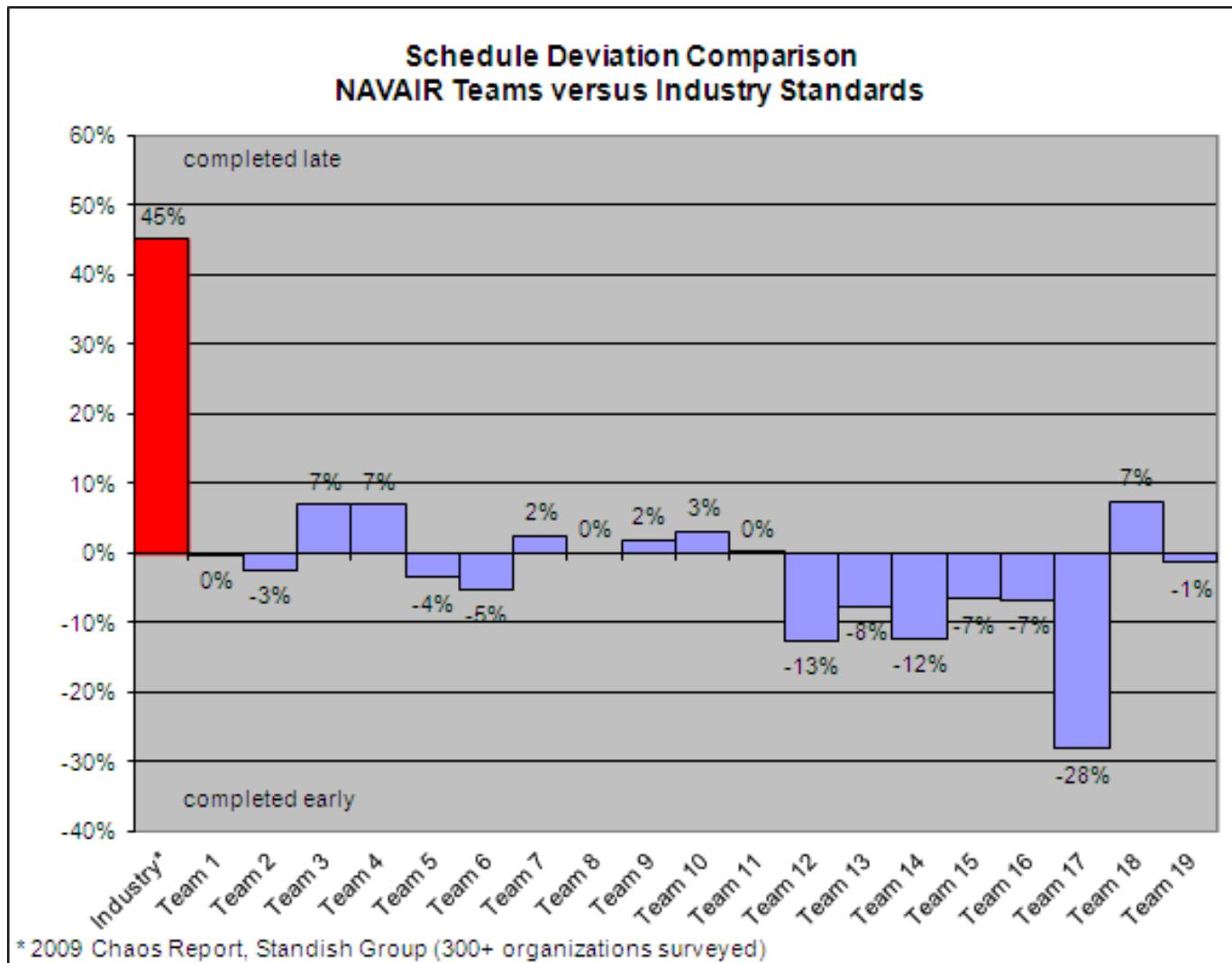
NAVAIR Teams
Effort Performance
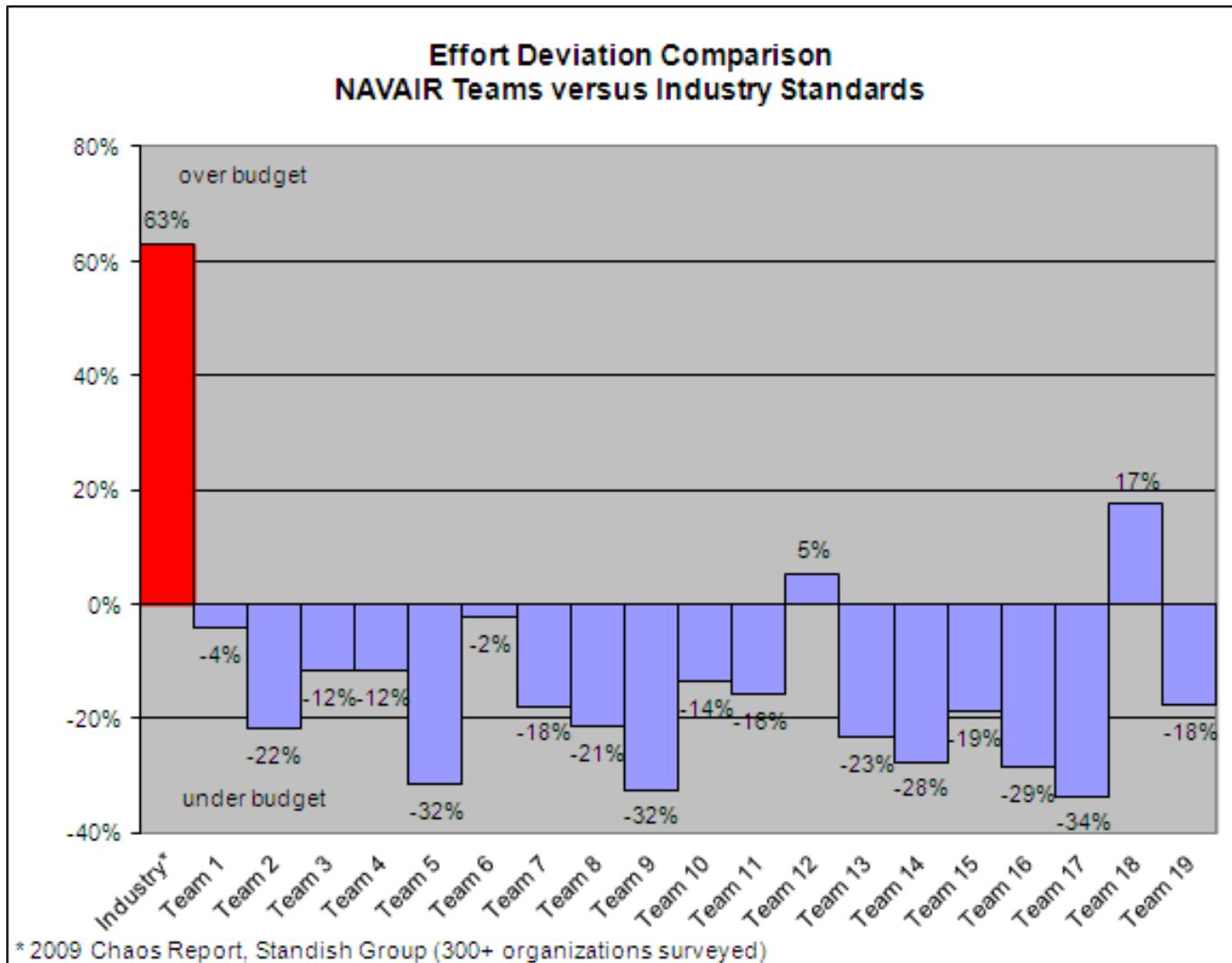
NAVAIR Teams
Quality in Test Time

Test Percentage Comparison
NAVAIR Teams versus Industry Standards

* Jones, Capers, ed. Tutorial: Programming Productivity: Issues for the Eighties, 2nd Ed., 1986
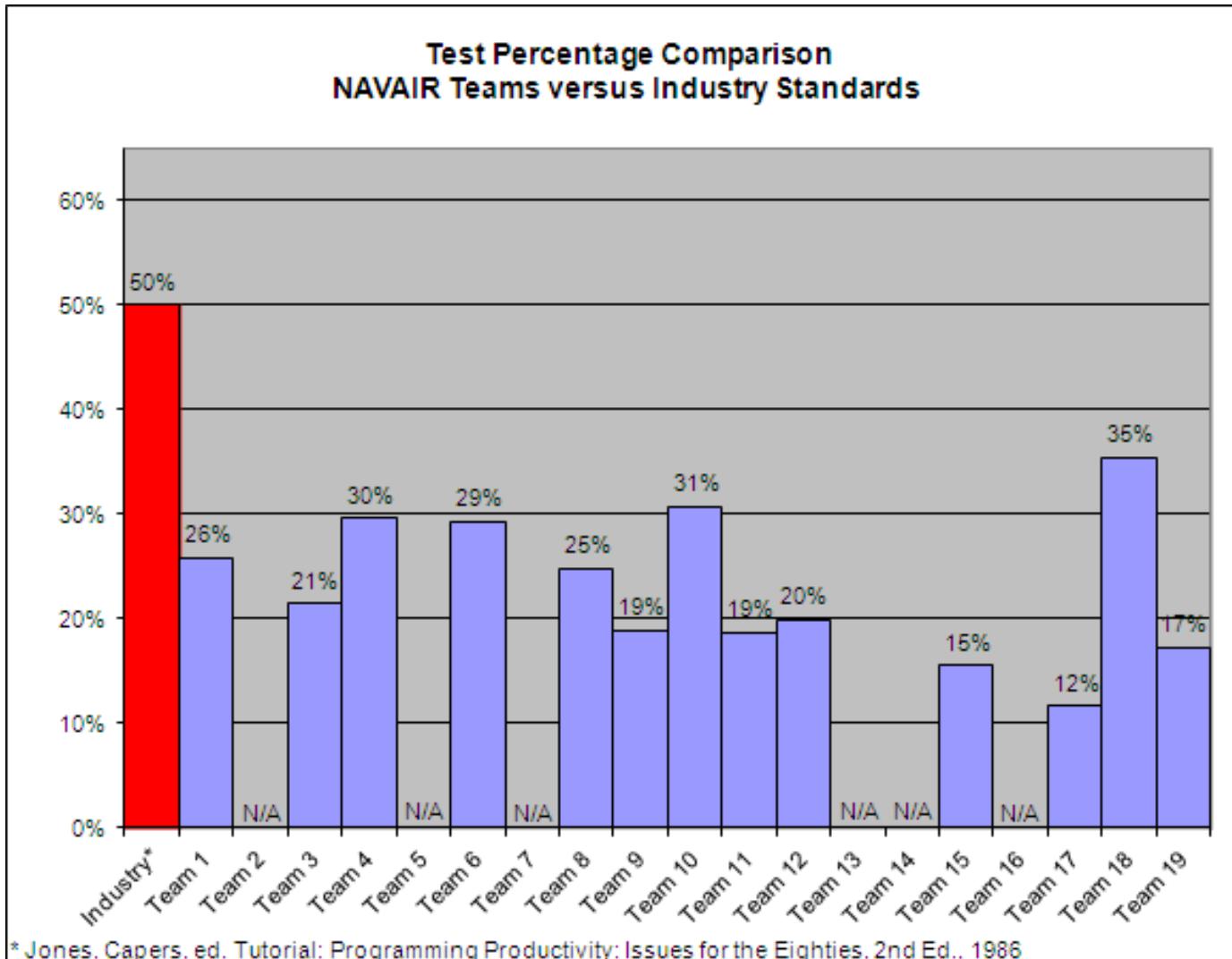
NAVAIR Teams
Cost of Improvement

Process Improvement / Development Cost Ratio Comparison
NAVAIR Teams versus Industry Standards

* Average percentage of on-line ROI Process Improvement case studies
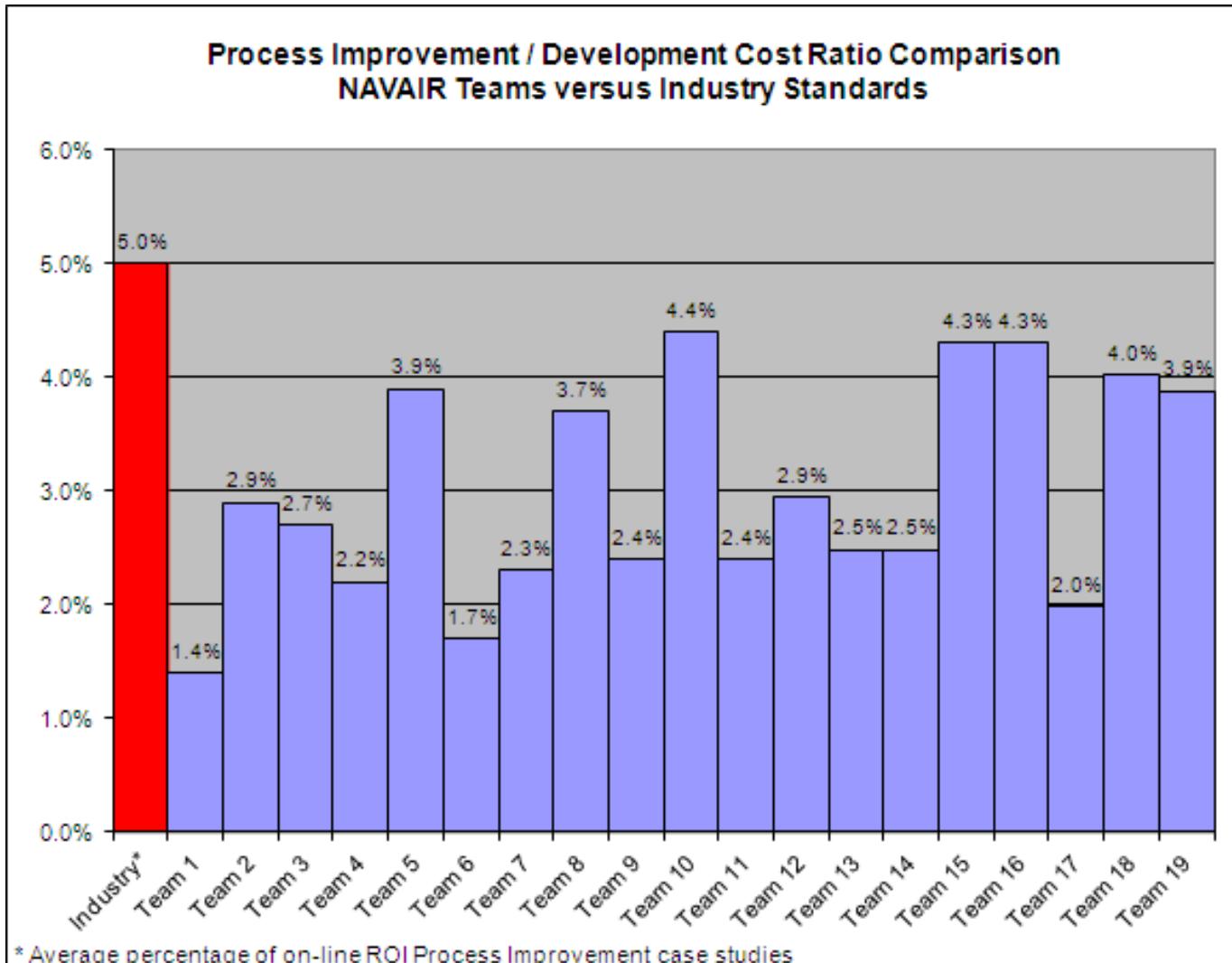
Things to Remember

- TPI may be applied to any team that has recurring work to perform

- These teams should plan their work, work to those plans, and collect data to track progress

- This gives them insight into the quality of the processes used to produce the products and the services they deliver

Questions?

NAVAIR PRT

Jeff Schwalb: 760 939-6226

Brad Hodgins: 760 939-0666

Trademarks and Service Marks

- The following are service marks of Carnegie Mellon University.
  - Team Software Process^{SM}
  - TSP^{SM}
  - Personal Software Process^{SM}
  - PSP^{SM}

- The following are registered trademarks of Carnegie Mellon University.
  - Capability Maturity Model$^{®}$
  - CMM$^{®}$
  - Capability Maturity Model Integration$^{®}$
  - CMMI$^{®}$
  - CERT$^{®}$

NAV AIR